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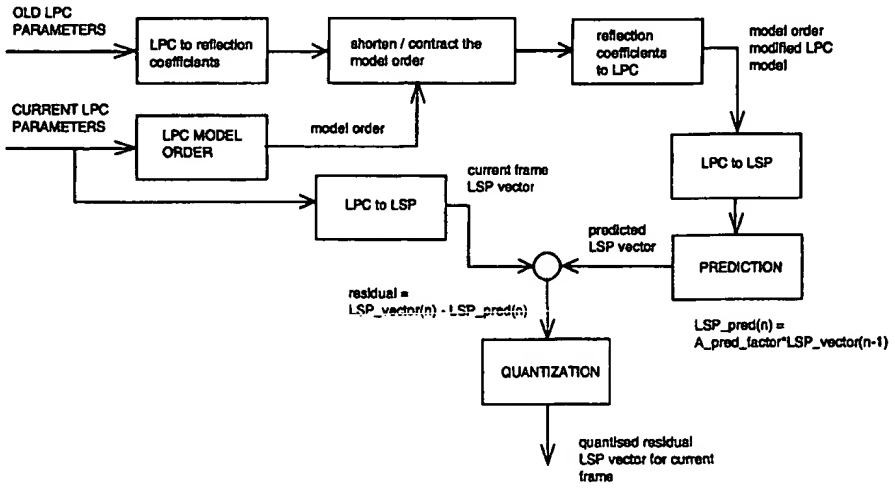
17 June 1999 (17.06.99)

(54) Title: SPEECH CODING



(57) Abstract

A method of coding a sampled speech signal in which the speech signal is divided into sequential frames. For each current frame, a first set of linear prediction coding (LPC) coefficients are generated, where the number of LPC coefficients depends upon the characteristics of the current frame. If the number of LPC coefficients in the first set of the current frame differs from the number in the first set of the preceding frame, then a second expanded or contracted set of LPC coefficients is generated from the first set of LPC coefficients for the preceding frame. This second set contains the same number of LPC coefficients as are present in said first set of the current frame. Respective sets of line spectra frequency (LSP) coefficients are generated for the first set of LPC coefficients of the current frame and the second set of LPC coefficients of the preceding frame. The sets of LSP coefficients are then combined to provide an encoded residual signal.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00715

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G10L 9/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	IEEE-IECEJ-ASJ International Conference on Acoustics...., Volume 2, 1986, (New York), Frederick L. Kitson et al, "A Real-Time ADPCM Encoder Using Variable Order Prediction", page 825 - page 828, see page 826, left column, line 4 - right column, line 20	1-16
A	US 5630011 A (JAE S. LIM ET AL), 13 May 1997 (13.05.97), column 12, line 64 - column 13, line 64	1,12
A	WO 9705602 A1 (QUALCOMM INCORPORATED), 13 February 1997 (13.02.97), page 2, line 35 - page 3, line 5; page 3, line 25 - page 4, line 32	4-6,8-9,17

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 April 1999	08 -04- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Peder Gjervaldsaeter Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00715

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Digital Speech Processing, Synthesis, and Recognition Sadaoki Furui Marcel Dekker, inc. New York and Basel see page 90, line 9 - page 91, line 12 --	4-6
X,P	Proceedings of the 1998 IEEE International Conference ..., Volume I, May 1998, (Seattle (USA)), Pasi Ojala et al, "VARIABLE MODEL ORDER LPC QUANTIZATION" -- --------	1-17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI98/00715

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 18-20
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
The technical features of the computer means in claim 18, the base station in claim 19 and the mobile phone in claim 20 are not given.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/03/99

International application No.
PCT/FI 98/00715

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5630011 A	13/05/97	AU 5682494 A	22/06/94
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		IL 118977 D	00/00/00
		IL 123119 D	00/00/00
		US 5754733 A	19/05/98